

Amendment to the Specification

Please replace the paragraph beginning on page 1, line 14 with the following paragraph:

The objects of the prior art are to let the diode have better heat transfer ability and resistance against ~~pressure~~ internal stress. But the structures of the prior art have their respective unavoidable disadvantages that reduce the industrial applicability. The structures disclosed in the present invention can avoid these disadvantages and greatly improve the industrial applicability.

Please replace the paragraph beginning on page 1, line 24 with the following paragraph:

2. The solder plate 17 on which the die 16 is set has no kink 13 (please refer to Fig. 6A). Thus the path of preventing the moisture is shorter and the diode 2 is easier to be damaged.

Please replace the paragraph beginning on page 2, line 7 with the following paragraph:

2. Besides, the shoulder 12 is shorter than the die 16. Since the thermal expansion coefficient of the epoxy 8 is larger than that of the copper housing, the expansion of the epoxy 8 generates ~~pressure~~ stress on the die 16 and can damage the die 16 when it suffers heat, or generates a gap between the shoulder 12 and the passivative material 10 that allows the moisture to enter and damage the diode 2.

Please replace the paragraph beginning on page 2, line 13 with the following paragraph:

1. The shoulder 12 is shorter than the die 16. The epoxy 8 generates ~~pressure~~ stress on the die 16 and can damage the die 16 when it suffers heat, or generates a gap between the shoulder 12 and the passivative material 10 which allows the moisture to enter and damage the diode 2.

Please replace the paragraph beginning on page 2, line 17 with the following paragraph:

2. The solder plate 17 on which the die 16 is set has no kink 13 (please refer to Fig. 6A). Thus the path of preventing to moisture is shorter and the diode 2 is easier to be damaged.

Please replace the paragraph beginning on page 3, line 1 with the following paragraph:

3. To improve the resistance against the ~~pressure~~ internal stress, which is caused by expansion or shrinkage depending on various working temperatures, and the moisture of the products and to extend the life cycle (since the path of preventing the moisture is longer, the diode 2 will be harder to be damaged).

Amendment to the Brief Description of the Preferred Embodiment

Please replace the paragraph beginning on page 4, line 6 with the following paragraph:

Fig. 1 represents the prior art ROC Patent Publication No. 419,758. The advantage is that since the shoulder 12 is taller than the die 16, the shoulder 12 will protect the die 16 from being pressed by either the expansion or the shrinkage of the epoxy 8 when the epoxy 8 suffers the heat. But the disadvantages are that: (1) during the etching process, since the shoulder 12 is taller than the die 16, it hinders the circulation of the etching solution, deteriorates the etching quality and makes the cleaning harder to do; (2) since the solder plate 17 on which the die 16 is set has no kink 13 (please refer to Fig. 6A), the path of preventing the moisture is shorter and the diode 2 is easier to be damaged.

Please replace the paragraph beginning on page 4, line 16 with the following paragraph:

Fig. 2 represents the prior art US Patent Publication No. 6,060,776. The advantage is that since the shoulder 12 is shorter than the die 16, the shoulder 12 would not hinder the etching solution from circulation and thus achieve a more complete and uniform etching in the process of etching the diode 2. Also it is easier to clean, thus the yield is improved and the average cost is reduced. However, the disadvantages are that: (1) when the etching process is done, it is harder to fix on the interface. In other words, it is harder to fix the passivative material 10 around the die 16 because it has to be done horizontally; (2) besides, the shoulder 12 is shorter than the die 16. Since the thermal expansion coefficient of the epoxy 8 is larger than that of the copper housing, the expansion of the epoxy 8 generates pressure stress on the die 16 and can damage the die 16 when it suffers heat, or generates a gap between the shoulder 12 and the passivative material 10 that allows the moisture to enter and damage the diode 2 directly.

Please replace the paragraph beginning on page 4, line 29 with the following

paragraph:

Fig. 3 represents the prior art reference PCT Patent Publication No. WO 95/15578. The advantage is that since the shoulder 12 is slightly shorter than the die 16, the shoulder 12 would not hinder the etching solution from circulation and thus achieve a more complete and uniform etching in the process of etching the diode 2. Also it is easier to clean, thus the yield is improved and the average cost is reduced. However, the disadvantages are that: (1) the shoulder 12 is slightly shorter than the die 16. Since the thermal expansion coefficient of the epoxy 8 is larger than that of the copper housing, the expansion of the epoxy 8 generates pressure on the die 16 and can damage the die 16 when it suffers heat, or generates a gap between the shoulder 12 and the passive material 10 that allows the moisture to enter and damage the diode 2 directly; (2) since the solder plate 17 on which the die 16 is set has no kink 13 (please refer to Fig. 6A), the path of preventing the moisture is shorter and the diode 2 is easier to be damaged.

Please replace the paragraph beginning on page 5, line 13 with the following paragraph:

Fig. 4 is the cross-sectional diagram of the structure of the preferred embodiment of the diode 2 of the present invention; said diode 2 comprises 2 major parts: a connecting means 6 and a heat sink base 7; one end of said connecting means 6 is a flat end 5 fixed on a die 16 and the other end has no fix shape (not shown); said heat sink base 7 comprises: a base 18 which is at the bottom of said heat sink base 7; a press-fit region 4 which is around said base 18; a solder platform 17 which is located above said base 18; a die 16 which has a first side and a second side electrically coupled to said flat-end 5 and said solder platform 17, respectively, and is fixed on said solder platform 17; a shoulder 12 which is extended from said solder platform 17, the root of said shoulder connected to said solder platform 17 has a kink 13; and a cup 14 which is extended upwardly from periphery of said base 18. A protective sheath 20 can be formed after the etching process and the passivant process are finished to ~~protect said head sink base 7~~ enhance its mechanical strength.

Please replace the paragraph beginning on page 5, line 28 with the following paragraph:

The present invention surmounts the disadvantages of the prior art and has the following advantages: (1) The etching of the diode 2 is more completely and evenly in the etching process and is easier to clean, thus improving the yield and reducing the cost. This is achieved by adjusting the height of the shoulder 12 to be substantially the same as the die 16. When the height of the shoulder 12 is substantially the same as the die 16, the shoulder 12 would not hinder the circulation of the etching solution. Thus, a more completely and evenly etching can be achieved. (2) It is easier for the passivant process on the interface portion, in other words, the passivant process of fixing the passivative material 10 (for example, polyimide, silicon rubber, silicone gel, etc.) is easier to proceed. This is achieved by the acclivitous shoulder 12. Since the passivative material 10 can be supported and fixed by the shoulder 12 in the passivant process, the passivant process becomes easier. (3) The present invention can absorb the stress directed to the die 16 generated by the expansion under heat or the shrinkage. This can be achieved by the combination of the acclivitous shoulder 12 and the kink 13 especially. Because said shoulder 12 and kink 13 can absorb the stress directed to the die 16 generated by the expansion of the epoxy 8 under heat or the shrinkage when the working temperature decreasing, so as to prevent the die 16 from being damaged during the different working situations and to avoid the generation of the crack gap between the shoulder 12 and the passivative material 10. (4) The present invention can extend the path of the moisture to the die 16, so as to improve the ability of the die 2 against the moisture and to extend the lifecycle of the die 2. Since the kink 13 exists as shown in Fig. 6A, the moisture can not reach the die 16 directly even if it enters the crack between the shoulder 12 and the passivative material 10. Thus, the ability of the diode 2 against the moisture is better and the lifecycle of the diode is extended.

Please replace the paragraph beginning on page 6, line 22 with the following paragraph:

Fig. 5 is the cross-sectional diagram of an alternative embodiment of the diode 2

of the present invention. The only difference between Fig. 4 and Fig. 5 is that the sheath 20 is ~~formed outside the cup 14 so as to protect the cup 14~~ located either inside or outside the cup 14.

Please replace the paragraph beginning on page 6, line 26 with the following paragraph:

Fig. 6 is the cross-sectional diagram of the heat sink base 7 of a diode 2 according to the present invention. It indicates that the height of the cup 14 and the shoulder are substantially the same. Alternatively, the height of the cup 14 can also be higher or lower than the shoulder 12 (not shown). Fig. 6 also indicates the position of the kink 13.

Please replace the paragraph beginning on page 6, line 31 with the following paragraph:

Fig. 6A is the partial enlargement of the cross-sectional diagram of the heat sink base 7 of a diode 2 according to the present invention. It clearly indicates the partial enlargement of the position where the kink 13 exists. Even if the moisture enters the ~~crack between the shoulder 12 and the passivate material 10,~~ gap between the shoulder 12 and the passivative material 10, it can not reach the die 16 directly compared with the conventional semiconductor devices. Thus, the ability of the diode 2 against the moisture is better and the lifecycle of the diode is extended.